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Artificial Satellites

in the book (their respective fields of science are given in parentheses): Mikhnevich, V.V., (temperature measurement at the altitude of 80-85 km); Astanovich, I.S. and Kaplan, S.A., (satellite's speed of re-entry); Okhotsimskiy, D.Ye., Eneyev, T.I. and Taratynova, G.P., (deceleration due to the resistance of air); Shternfel'd, V. and Vorontsov, V., (space ships); Kondratyuk, Yu.V., (Interplanetary flight); Barbarov, N.A., (rocket launching from aircraft); Tsander, F.A. (finned rockets); Yegorov, V.A. (motion of satellites); Pokrovskiy, A.V., (experimental flights to the altitude of 110-200 km); Orlov, V.S. and Levin, B.Yu., (study of meteorites); Karpenko, A.G. and Lidov, M.L., (conditions of temperature in the Earth satellites); Vavilov, V.S., Malovetskaya, V.M., Galkin, G.N., Landsman, A.P., (improvement of silicon photo elements used as a source of power in artificial satellites); Molchanov, P.A., (automatic radio communication); Gringauz, K.I. and Zelikman, M.Kh., (study of the concentration of positive ions along the satellite's orbit); Istomin, V.G., (study of ionized layers of the atmosphere); Dubrovin, (determination by radio of the culmination point of a satellite); Yatsunskiy, I.M., (geodesic research); Danilin, B.S., Repnev, A.I., Shvidkovskiy, Ye.G., (precise methods of density and pressure measurement); Fesenkov, V.G., (study of meteorites);



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Poloskov, S.M., Nazarova, T.N., (study of the concentration of the interplanetary dust on the surface of the Earth); Ginsburg, V.L., (study of the luminosity of the meta-galactic); Mandel'shtam, S.L., Yefremov, A.I., (study of the ultra-violet rays); Vernov, S.N., Ginsburg, V.L., Kurnosova, L.V., Razorenov, L.A., Fradkin, M.I., (research on primary cosmic radiation); Vavilov, Cherenkov, (study of charged particles moving at a speed surpassing the speed of light in the medium in which it is traveling); Logachev, Yu.I., Chudakov, A.Ye., Shafer, Yu.G., (study of cosmic radiation); Gaysler and Pan'kov, (Poland, changing the astroid Hermes to a satellite of the Earth). There are no references.

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Kem

SHTERNFEL'D, ~~Aleks A.~~ Arig A.,

Chairman, Sci Technical Com. on Cosmic Navigation, ~~Astronavigation~~ Astronautics Section, Cent.

Air Club USSR ~~1953-54~~ im V. P. Chkalov

Astro Physics, guided missiles.

Int'l. Merit Prize for Interplanetary Travel.

Problems of space flight, fuel consumption by a rocket passing up through the atmosphere with constant acceleration, route of interplanetary ships, paradoxes of cosmic navigation, flight to the moon, rocket fuels, space satellite research, ~~Sun flight~~, Venus flight

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNFEL'D, Arie Abramovich

"Artificial Satellites of the Earth,"

Published by the State Publishing House of Technical and Theoretical Literature, Moscow, V-71, B. Kaluzhskaya, 15. Pages 1-180, 1958

Trans . JPRS Rpt 191

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNFELD, A.

Artificial satellites. Tekhn.mol. 26 no.2:5-7 '58. (MIRA 11:2)
(Artificial satellites)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

29(0) PHASE I BOOK EXPLOITATION SOV/3287

Shternfel'd, Ario Abramovich, Winner of the International Prize for the Promotion of Astronautics

Ot iskusstvennykh sputnikov k mezhplanetnym poletam (From Artificial Satellites to Interplanetary Flights) 2d ed., rev. and enl. Moscow, Fizmatgiz, 1959. 202 p. 75,000 copies printed.

Ed.: I. Ye. Rakhlin; Tech. Ed.: N. Ya. Murashova.

PURPOSE: This booklet is intended for the general reader interested in space exploration and travel.

COVERAGE: This booklet provides a generalized account of extra-terrestrial exploration as of October 1959. The author discusses both Soviet and non-Soviet space vehicles, satellites, and experiments. He treats lunar probes and the prospects of a man-in-space project. The possibilities of interplanetary travel are also discussed. TASS news bulletins on the launching of the second and third Soviet space rockets are included. The Appendix contains technical specifications of artificial earth satellites.

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No personalities are mentioned. No references are given.

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Shternfel'd, Ario Abramovich

Soviet Space Science, by Ari Shternfeld. 2nd. Rev. ED. New York, Basic Books, 1959.

XXII, 361 P. Illus., Charts, Diagrs., Tables.

Translated by the Technical Documents Liaison Office, Wright Patterson Air Force Base, Ohio, from the original Russian title: Iskusstvennyye Sputniki. Moskva, 1958.

Also published under title: Artificial Satellites. Wright-Patterson Air Force Base, Ohio, 1958.

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

29(0)
AUTHOR: Shternfel'd, A., Holder of the International Prize for the Promotion of Astronautics

SOV/29-59-4-5/26

TITLE: The Moon of the Big Moon (Luna bol'shoy Luny)

PERIODICAL: Tekhnika molodezhi, 1959, Nr 4, p 4 (USSR)

ABSTRACT: The author reports here on the possibility of creating an artificial moon satellite. This would make it possible to observe the moon surface in smallest details on the earth by means of a television camera. It does not appear so very difficult to send a rocket to the other side of the moon. A far bigger problem is that of controlling the propulsion in a way as to apply to the rocket the required speed and direction. The smallest deviation from the calculated speed would cause the rocket either to crash on the moon or to pass it at too great a distance. To avoid any damage, the entire trajectory should be under control. At any rate, it will hardly be possible for a rocket to approach safely the moon by less than 200 km. According to calculations this is the distance at which the rocket could be transformed into a moon satellite. Furthermore, its horizontal speed should be such as to prevent

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the satellite by the mechanical onward movement from crashing on the moon. This speed is 1590 m/sec, i.e. about five times less than the speed of the satellite revolving around the earth. By the said speed the satellite would revolve around the moon in 2 hours 7 minutes on an orbit of 12,177 km. It would not fly for more than 45 minutes 15 seconds in the shadow of the moon. The mountain peaks on the moon are about as high as Mount Everest, i.e. about 9 km. and that means that the satellite should not fly lower than 10 km above the moon surface. To lower the satellite from a distance of 200 km to 10 km, its flying speed should be slowed down by 41.5 m/sec, in which case it would deviate from its orbit and approach the moon surface. The "drop" in an elliptical curve would take 1 hour 2 minutes. The speed would rise to 1719 m/sec and the satellite would soar up again to 200 km altitude. The time it would be in the proximity of the moon surface would be too short as to permit accurate observations. For this reason it would be necessary to put it into an orbit. This would be made possible by decreasing its speed of 1719 m/sec by 45 m/sec at 10 km altitude. Satellites flying at an altitude of 200 - 10 km could revolve around the moon for about 308-363 times



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SHTERNFEL'D, A.A., laureat Mezhdunarodnoy premii pooshchreniya astronavtiki (Moskva)

Flights into space. Nauka i zhyttia 10 no.2:14-17 F '60. (MIRA 13:6)
(Astronautics)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNFEL'D, A.A., laureat Mezhdunarodnoy pooshchritel'noy premii po astronavtike (Moskva)

Space flight to Venus. Nauka i zhyttia 10 no.7:18-21 Jl '60. (MIRA 13:7)
(Space flight to Venus)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNFEL'D, ARIO ABRAMOVICH

FROM MAN-MADE SATELLITES TO INTERPLANETARY FLIGHTS. [TRANSLATION] PREPARED BY: TECHNICAL DOCUMENTS LIAISON OFFICE, MCLTD, WRIGHT-PATTERSON AFB, OHIO, 1961

210L. ILLUS., DIAGRS., TABLES (ITS: MCL-1303/1 #2)

TRANSLATED FROM THE ORIGINAL RUSSIAN: OT ISKUSSTVENNYKH SPUTNIKOV K MEZHPLANETNYM POLETAM. 2D. REV. ED. MOSCOW, 1959

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D036/D113

3,2300

AUTHOR: Shternfel'd, A., Winner of the International Incentive Prize for Astronautics

TITLE: Twenty-four hours in space opens the way to the planets

PERIODICAL: Tekhnika molodezhi, no. 11, 1961, 14-15

TEXT: The author discusses space flights which could be completed in 25 hours 18 minutes, the duration of German Titov's space flight. During this time, a rocket fired vertically from the Earth's surface at a launching speed of 10.8 km/sec, its engines subsequently being switched off, would reach a height of 90,000 km. To carry out such a flight and then return to Earth, the rocket would ascend for 12 hours 39 minutes, developing a speed of 10.7 km/sec; reaching a maximum altitude of 81,000 km, it would stop for an instant and then descend, reaching the Earth 25 hours and 18 minutes after launching time. In 25.3 hours a spaceship could fly around the Earth along a huge closed ellipse with a major axis of 87,400 km and a minor axis of 23,100 km. The engines would be switched off along the perigee at an altitude of 200 km, after which the ship would coast, gradually gaining

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Twenty-four hours in space ...

altitude, until after 12 hours 39 minutes it would reach its apogee 74,400 km above the Earth's surface. The spaceship would then begin to descend, and after the same period of time would return to the Earth's atmosphere at an altitude of 200 km. The launching speed of the spaceship for such a flight would be 10.2 km/sec. Cosmonauts aboard a stationary satellite would be able, under certain conditions, to "jump aboard" another satellite flying along a circular orbit with a radius of 43,700 km and a circling time (in respect to the stars) of 25 hours 18 minutes - a period during which Titov suffered no ill effects due to weightlessness. During their stay on the stationary satellite, the cosmonauts would be able to create artificial gravity aboard by rotating the craft about its center of gravity. A huge figure eight would be produced by joining all the points on the Earth's surface from which such a satellite (i.e. one having an orbital radius of 43,700 km and an orbital plane passing through the poles of the Earth, and a circling time of 25 hours 18 minutes) would be successively visible at its zenith. In the case of an equatorial satellite, this projection would have the form of a straight line. The speed and direction of an equatorial satellite with a circling time of 25.3 hours, as seen by an observer at the equator, would vary in accordance with whether the direction of the satellite's motion



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Twenty-four hours in space ...

coincided with that of the Earth's axial rotation or not. In the former case it would appear to be travelling very slowly, and to get into orbit from a stationary satellite would require an initial speed of only 27 m/sec. In 25 hours it would be possible to fly to the Moon. This would require a launching speed of about 12 km/sec, only 8% more than the minimum launching speed, when the flight would last 5 days and nights. In the case of a 25-hour-flight, the space ship would fly along a hyperbolic trajectory and reach the Moon's orbit at a speed of 4.4 km/sec; for the 5-day-flight the trajectory would be semi-elliptical and the apogean speed only 0.2 km/sec. As the ship would move towards the moon at 2.4 km/sec due to lunar attraction, the speeds which would have to be counteracted for landing on the moon, would be 2.6 km/sec for the 5-day-flight and 6.8 km/sec for the 25-hour-flight. Calculations show that it would be necessary to brake at a speed of 2.41 km/sec in the former case and 5.01 km/sec in the latter. If the rocket's exhaust velocity is 3 km/sec, then the weight of fuel required for braking would be 1.23 times greater than the weight of the rocket in the first case and 4.31 times greater in the second case. In 25 hours 18 minutes, an artificial satellite could fly once around the Sun in an orbit

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Twenty-four hours in space ...

with a radius of 3,040,000 km. It would then be 2,340,000 km from the Sun's surface, at which distance the Sun's rays would be 19 times less intense than near its surface. If the satellite were shaped like a greatly extended cylinder with a hemisphere at each end, if its axis were oriented parallel to the Sun's rays, if the hemisphere facing the Sun were made to reflect back almost all the rays and the rest of the skin were made of heat-reflecting material, then the internal temperature of the cabin would not be too high for the cosmonaut. Most of the satellite's surface would be in the shade. In 25 hours 18 minutes, an artificial satellite could fly once around the largest comet known to man - that observed in 1818, with a mass of $2.10^{13}$ tons and a nucleus 20 km across - in a circular orbit with a radius of 59 km. The speed of such a satellite would be 15.5 km/hr. In conclusion, the author remarks that the longer man will be able to stay in the cosmos, the greater the number of possible cosmic flights. There are [illegible] figures.

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SHTERNFEL'D, A.A., laureat Mizhnarodnoi zaokhochuval'noi premii z astronavtiki

Conquering space. Nauka i zhyttia 11 no.5:29-32 My '61.
(MIRA 14:7)

1. Pochesniy chlen Lotarings'kogo vchenogo Tovaristva (Moskva).
(Astronautics)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGAS, Ya.; AFANAS'YEVA, K.

Polyvinyl chloride linoleum. Stroi. mat., izdel. i konstr. 2 no.7:13-14 Jl '56. (MLRA 9:10)

1. Glavnyy inzhener Mytishchinskogo silikatnogo zavoda (for Shterngas).
(Linoleum) (Ethylene)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGAS, Ya., inzh.

Possibllities of using higher pressure in autoclaves. Stroi. mat. 4 no.9:14-17 S '58. (MIRA 11:10)
(Autoclaves)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

ARISTOV, F.M.; SHTERNGAS, Ya.S.

Output of linoleum has increased 50%. Stroi. mat. 10 no.3:
6-7 Mr '64. (MIRA 17:6)

1. Direktor Khlyupinskogo zavoda linoleuma (for Aristov).
2. Glavnyy inzh. Khlyupinskogo zavoda linoleuma (for Shterngas).

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGERTS, A.N.

Ophthalmologists in Sweden; remarks of a physician. Vest. oft. 71 no.2:50-52 Mr-Ap '58. (MIRA 11:4)

1. Glaznoye otdeleniye bol'nitsy No.3 g. Gorlovki.
(OPHTHALMOLOGY
in Sweden)

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SHTERNGERTS, I.S.

Staining of trichomonas. Akush. gin. no.3:67 May-June 1953. (CIML 25:1)

1. Of Sverdlovsk Scientific-Research Institute for the Care of Mother and Child (Director -- R. A. Malysheva).

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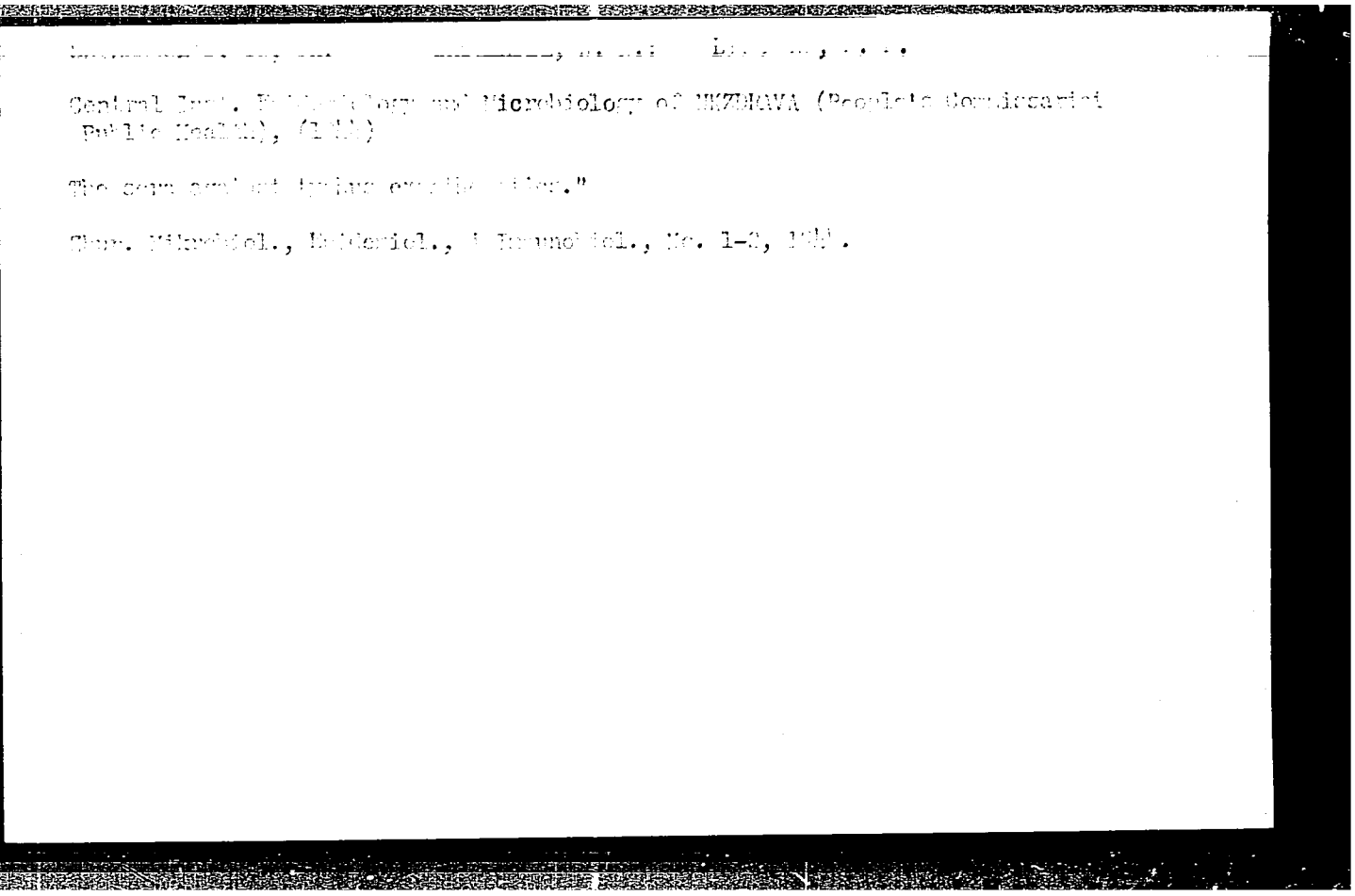

[illegible]

Central Inst. Epidemiology and Microbiology of NKZDRAVA (Peoples Commissariat Public Health), (1944)

The serum against typhus exanthematics."

Zhur. Mikrobiol., Epidemiol., i Immunobiol., No. 1-2, 1944.

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

GIL'DIN, S. R., SHTERNGOL'D, YE. YA., ASHMARIN, I. I., ZHDANOVA, L. D., ZVAGEL'SKAYA, V. N., KALININA, YE. F., LOSKUTOVA, N. N., PYZHOVA, M. M., AND SLAVINA, A. M.

Further Observations on the Effectiveness of Subcutaneous Vaccination Against Dysentery

Shows that the epidemiologic effectiveness of subcutaneous vaccination against dysentery is very low and has no advantages over the enteral method. (RZhBiol, No. 7, 1955) Vopr. Kravevoy Patologii AN UzSSR, 3, 1953, 51-52

SO: Sum. No. 744, 8 Dec 55 - Supplementary Survey of Soviet Scientific Abstracts (17)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

ZVAGEL8SKAYA, V.N.; SHTERNGAL'D, Ye.Ya.

Finds of Sp. latyshevi in rodents in Uzbekistan. Med. paras. i paraz. bol. no.2:180 Ap-Je '54. (MLRA 7:8)

1. Iz Tashkentskogo instituta epidemiologii i mikrobiologii.
(SPIROCHAETA,
*latyshevi, in rodents)
(RODENTS,
*Spirochaeta latyshevi in)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGOL'D, Ye.Ya.

Role of the reticulo-endothelial system in the mechanism of immunity to typhus fever. Vop.kraev.pat. no.4:88-98 '54. (MLRA 9:12)
(IMMUNITY) (TYPHUS FEVER)
(RETICULO-ENDOTHELIAL SYSTEM)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGOL'D, Ye.Ya.

Immunological reactivity of animals in experimental typhus fever in connection with the different functional states of their nervous system. Vop.kraev.pat. no.4:99-107 '54. (MLRA 9:12)
(TYPHUS FEVER--PREVENTIVE INOCULATION)
(NERVOUS SYSTEM)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGOLD, E. Ya.

2

**3187. Comparative evaluation of different serological reactions for diagnosis of sporadic atypical typhus.** E. Ya. Shternfeld and A. I. A[illegible] *Vrad. Nauk. Dzhch. S.S.R.* 1955, No. 6, 150–15[illegible]. *Referat. Zh. Biol.* 1956, Abstr. No. 75582. Comparative serological study of the sera of patients with a clinical diagnosis of typhus showed the [illegible] diagnostic value of the complement [illegible] [illegible] related to recurrent illnesses taking as a rule a slight and atypical course. In a group of patients with other febrile diseases (sometimes with unexplained diagnoses) 10% were shown to be cases of typhus with atypical course. C.F.R. very often gave a positive result on the 6th–7th day of the disease. The importance of the high specificity of C.F.R. for diagnosis of sporadic atypical cases of typhus is stressed. A supposed possible connection of these cases with endemic murine typhus was excluded by reason of the behaviour of strains isolated from primary and recurrent cases in guinea pigs, and results of the C.F.R. of sera of convalescent guinea pigs and sick people with antigens of *Rickettsia prowazeki* and *R. mooseri*. (Russian) C. C. Barnard

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

KHODUKIN, N.I.; SHTERNGOL'D, Ye.Ya.; SHLEYKHER, E.I.; ZVAGEL'SKAYA, V.N.

Experience in the preparation of vaccine against Q fever. Zhur. mikrobiol.epid. i immun. 27 no.7:22-23 Jy '56. (MLRA 9:9)

1. Iz Tashkentskogo instituta vaktsin i syvorotok.
(Q FEVER, prev. and control
vaccine prep. from spleens of white mice)
(SPLEEN
prep. of Q fever vaccine from spleen of white mice)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGOL'D, Ye.Ya.

Producing a non-reactogenic vaccine against Q fever. Zhur. mikrobiol., epid. i immun. 32 no.9:12-18 S '61. (MIRA 15:2)

1. Iz Tashkentskogo instituta vaktsin i syvorotok.
(Q FEVER) (VACCINES)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGOL'D, Ye.Ya.

Use of microagglutination with R. burneti in the diagnosis of Q fever. Zhur.mikrobiol., epid. i immun. 32 no.10:136 O'61. (MIRA 14:10)

1. Iz Tashkentskogo instituta vaktsii i syvorotok.
(Q FEVER) (SERUM DIAGNOSIS)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTEYNGOL'D, Ye.Ya.

Reactivity of the RES elements of white mice during intraperitoneal infection with exanthematous typhus. Trudy TashNIIVS 6:175-181 '61. (MIRA 15:11)

(TYPHUS FEVER) (RETICULO-ENDOTHELIAL SYSTEM)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNGOL'D, Ye.Ya.; SHLEYKHER, E.I.; UMIDOVA, L.SH.

Immunological effectiveness of Q vaccine. Trudy Tash. NIIVS 5:47-52'62. (MIRA 16:10)
(Q FEVER — PREVENTIVE INOCULATION) (IMMUNITY)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

AUTHORS: Faygenbaum, D.S., and Shternin, L.A., Engineers 135-9-19/24

TITLE: Condenser Contact Welding Machine "MTK-0,1" (Kondensatornaya machina dlya kontaktnoy svarki "MTK-0,1")

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, # 9, p 36-37 (USSR)

ABSTRACT: The condenser contact welding machine "MTK-0,1" was designed for welding ferrous and non-ferrous metals of 0.02 to 0.15mm thickness. It is a table model and can work with a stationary welding head as well as with changeable welding tools and is suited for welding in assembling instruments and radio equipment. The design of the machine is described in detail and illustrated by a photograph and an electric diagram. The advantages of electrolytic condensers are discussed. Condensers "КЭ -2Н" were found to be the most advantageous. These latter are extensively employed in mass-produced radio sets (in feeding filters of broadcasting receivers and television sets).
The article contains 1 photograph and 2 diagrams.

ASSOCIATION: VNIIESO

AVAILABLE: Library of Congress

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83552

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A006/A002

1.2300 also 2508

AUTHORS: Shternin, L. A., and Bol'shev, S. A., Engineers

TITLE: Friction Welding of Parts at the "Elektroapparat" Plant

PERIODICAL: Svarochnoye proizvodstvo, 1960, No. 9, pp. 37-38

TEXT: The MCT-2 and the MCT-31 (MST-2 and MST-31) friction welding machines were brought into use at the Leningrad "Elektroapparat" Plant. Their technical data are given in Table 1. The introduction of the machines was performed with the assistance of VNIIESO where they had been designed and manufactured. The machines are intended for small-scale production. Ordinary three-jawed holding devices of 165 and 250 mm respectively are used. The reduction forces in welding are transmitted to supports limiting the length of the parts to be welded to 380 mm on the MST-2 and to 1,000 mm on the MST-31 machine. The welding cycle is automated. The parts to be welded are, as a rule, connections of a rod with a plate. Flat parts are mounted on a device which is fixed to one of the holders, thus reducing the operational time. Welding of levers, rollers, shafts, pins, insertion pieces and strips can now be performed by friction. Raised labor efficiency, reduced consumption of metal, electrodes

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A006/A002

Friction Welding of Parts at the "Elektroapparat" Plant

and electric power, and improved work conditions prove the efficiency of the new method. Welding conditions are given in Table 2. There are 3 figures and 2 tables.

ASSOCIATION: VNIIESO-Shtermin, L. A., "Elektroapparat" Plant-Bol'shev, S. A.

Card 2/2

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

S/110/61/000/001/014/023
E194/E455

AUTHORS: Shternin, L.A., Engineer, Prokof'yev, S.N., Engineer, Orlov, Ya.M., Engineer and Kobyl'nitskaya, M.I., Engineer

TITLE: The Introduction of Friction Welding of Copper Current-Conducting Parts

PERIODICAL: Vestnik elektropromyshlennosti, 1961, No.1, pp.44-45

TEXT: This article describes experience of using a friction welding machine type MCT-6 (MST-6) for friction welding of a small copper assembly. In the old method of construction, a copper pin 12 mm diameter was turned down at one end to fit a brass washer and was soldered to a strip of copper 2 mm thick. Friction welding was the most suitable for such parts, as arc welding could not be used. The machine type MST-6 has a motor of 2.8 kW, the spindle is driven at 4000 rpm and an axial force of 50 to 1000 kg can be applied pneumatically. The welding time can be controlled within the range 0.5 to 2.5 sec, and the complete cycle has a duration variable between 5 and 15 sec. The machine automatically loads the pins into the pressure device of the spindle, brings the strip up to the spindle, makes the weld and discharges the welded products.

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E194/E455

The Introduction of Friction Welding of Copper Current-Conducting Parts

The parts are carried on a rotating table with eight positions. Pneumatic drive is used to turn the table. Welding can be effected with very little distortion of the parts. The use of the machine has simplified production of the parts; there is no need to make the brass washers, to roll the parts together or to clean them after soldering. By use of the machine, the standard time for making the parts was reduced from 1.6 to 0.25 hours per hundred. The economy of wages was 6.95 roubles per 100 parts. The properties of the finished parts are improved. It is necessary that the surfaces of all the parts should be equally clean. This is achieved by etching in a mixture of sulphuric and nitric acids, followed by water washing and compressed-air drying. There are 2 figures.

SUBMITTED: June 14, 1960

Card 2/2

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1.2310 2408 1573

28984 S/135/61/000/011/006/007
A006/A101

AUTHORS: Shternin, L. A., Prokof'yev, S. N., Engineers

TITLE: Friction welding of aluminum with steel and copper

PERIODICAL: Svarochnoye proizvodstvo, no. 11, 1961, 30-32

TEXT: Information is given on results of experiments made for the purpose of determining the basic parameters of conditions for friction welding АД-1 (AD-1) aluminum rods, 30, 40, and 50 mm in diameter with grade СТ.3 (St.3) steel and M1 copper. Aluminum was friction welded with steel on a МСТ-31 (MST-31) machine; the rotation of the welded blanks varied from 230 to 1,000rpm; axial forces of up to 20,000 kg were developed. The aluminum blank was clamped in a steel mandrel eliminating the heat and preventing its free deformation during welding. The blank protruded from the mandrel to a given length depending on the diameter of the specimen. The quality of weld joints was determined from the bending angle, when the welded specimens were subjected to tensile and shearing tests. It was found that the speed of relative rotation affected considerably the quality of welds; it should not be less than 760 rpm when welding 30 mm diameter blanks. Specimens of 40 mm diameter were tested, to

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Friction welding of aluminum with steel ...

determine the dependence of the bending angle of the welded joint on the specific pressure at heating and peening and rotation speed of 760 rpm. Specific heating pressure should not be below 5 kg/mm$^2$. Tests with 30 mm diameter specimens show that at this pressure the specific peening pressure does not affect the weld quality, which remain satisfactory at both constant or increased pressure. Tests with 50 mm diameter steel specimens welded with Al did not show fracture resistance of all the specimens at 180$^0$ bending; however, in a number of cases the results were satisfactory. Ultimate strength of the butt metal was 10 kg/mm$^2$ against 8.5 kg/mm$^2$ of the base metal; it was 7.5 - 8.2 kg/mm$^2$ in the shearing tests. Microhardness corresponded to that of the base metal. Friction welding of 20 mm diameter aluminum with copper was also performed on a MST-31 machine. To remove case hardness the copper surface was machined and annealed at 600 - 700$^0$C for 30 minutes. Tests showed that in all cases, excepted when the specimens were welded at 2 kg/mm$^2$ specific heating pressure, the failure occurred in the aluminum remote from the butt. It was found that welds produced by the described method show satisfactory qualities. The main features distinguishing friction welding of aluminum with copper or steel from other metal combinations are: 1) the aluminum butts must be carefully cleaned; 2) the blanks should be fastened with steel mandrels; 3) the gauged length of the aluminum blank

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must be carefully observed; 4) copper blanks must be machined, annealed and cleaned; 5) high peening pressure during the welding of copper with aluminum promotes apparently the destruction and removal of brittle components, thus raising the quality of welds. There are 4 tables and 3 figures.

ASSOCIATION: VNIIESO

Card 3/3

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A004/A101

I 2310 1573

AUTHORS: Shternin, L.A., Komarcheva, E.S., Val'ter, I.G., Engineers

TITLE: Friction welding in the manufacture of turbo-compressors

PERIODICAL: Svarochnoye proizvodstvo, no. 1, 1962, 14 - 16

TEXT: The authors analyze the results of technological investigations of the friction welding of austenitic ЭИ 572 (EI572) steel to pearlitic steels of the OXM (OKhM) and 40 X (40Kh) grades. They describe the welding conditions and heat treatment and present the results of mechanical testing of the welding joints. The investigations to study the possibility of using friction welding in the manufacture of turbo-compressor runners were carried out by VNIIESO and TsNIDI. The 40Kh grade steel was subjected to preliminary heat treatment - oil-hardening at 840°C, tempering at 550°C (with subsequent water cooling) - while the OKhM steel was welded as delivered. The austenitic steel blanks were produced by investment pattern casting and subjected to the following heat treatment: austenizing 1,160 - 1,180°C with water quenching, dispersion hardening at 750°C with 15 hours holding and air-cooling. Specimens 16, 20 and 28 mm in diameter were welded. The chemical and mechanical properties of the steels are shown in

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Friction welding ...

a number of tables. The major part of the welding operation was carried out on the MCT -31 (MST-31) machine, developing an axial stress of up to 14,000 kg, while the relative rotation speed of the blanks being welded amounted to 1,000 rpm. The authors give a description of the welding conditions and point out that an analysis of the results obtained at different welding conditions showed that the notch toughness of the welding joint was stable only under the condition of using a specific peening force equal to 21 kg/mm$^2$. In this case, the specific heating stress amounted to 6 kg/mm$^2$. A batch of specimens friction-welded under these conditions, was subjected to mechanical tests the results of which are shown in a table. Moreover, fatigue strength tests of the welded specimens with alternating loads were carried out on the BY -8 (VU-8) machine at the Leningradskiy politekhnicheskiy Institut im. Kalinina (Leningrad Polytechnic Institute im. Kalinin). In the tensile and endurance tests all welding joints were destroyed along the EI572 steel base metal. The authors present a number of microsections, showing the microstructure of the welded specimens after etching. The analysis of the mechanical and metallographic investigations reveals that the friction welding of austenitic steel to pearlitic steel yields a dependable joint with a sufficiently high strength, exceeding in some cases the indices of welded austeni-

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Friction welding ...

tic steels. The equipment existing and being under construction at present for friction welding makes it possible to weld turbo-compressor runners with shafts up to 50 mm in diameter. There are 6 figures and 5 tables.

ASSOCIATIONS: VNIIESO (Shternin, L.S., Komarcheva, E.S.); TsNIDI (Val'ter, I.G.)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNIN, L.A., inzh.; KOMARCHEVA, E.S., inzh.; VAL'TER, I.G., inzh.

Friction welding in the manufacture of turbocompressors. Svar.proizv. no.1:14-16 Ja '62. (MIRA 15:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut elektrosvarochnogo oborudovaniya (for Shternin, Komarcheva). 2. TSentral'nyy nauchno-issledovatel'skiy dizel'nyy institut (for Val'ter).
(Compressors--Welding) (Steel--Welding)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

GINZBURG, S.K., inzh.; PROKOF'YEV, S.N., inzh.; SHTERNIN, L.A., inzh.

Conditions for the formation of a resistant joint in the friction welding of aluminum with steel. Svar. proizv. no.12:12-14 D '62. (MIRA 15:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut elektrosvarochnogo oborudovaniya.
(Aluminum—Welding)
(Steel—Welding)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

S/0135/64/000/006/0023/0024

ACCESSION NR: AP4040701

AUTHORS: Vill', V. I. (Candidate of technical sciences); Komarcheva, E. S. (Engineer); Shternin, L. A. (Engineer)

TITLE: Friction welding of thin-wall pipes made of aluminum alloys

SOURCE: Svarochnoye proizvodstvo, no. 6 (630), 1964, 23-24

TOPIC TAGS: welding, pipe, thin walled pipe, aluminum alloy, steel 1Kh18N9T, aluminum AD1, aluminum AMts, welder MST31

ABSTRACT: Butt-welding of pipes with the ratio $D/\delta = 25-30$ often produces deformation and lowers thermal properties. To avoid this, a new method was developed for welding thin-wall pipes different metals with different thermal porperties (such as steel and aluminum). This improved friction-welding technique resulted in higher quality of welds, localized heating, small power comsumption, and the even distribution of temperature along the welding surface. A serious obstacle in the practical application was the initial ellipticity of pipes and their off-axial alignment in the welder. These shortcomings were eliminated by the design of a special device shown in Fig. 1 of the Enclosure. Here two cylindrical plugs (1 and 2) were fitted into the pipes; a cylindrical rod (3) freely entered

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ACCESSION NR: AP4040701

the bearing (4) which was fixed in the plug (1). The guide placing the rod in the bearing secured an accurate axial allignment of the details; it did not prevent their free rotation before and during welding. Plugs fitting tightly into the pipes eliminated their ellipticity. Experiments were performed with steel 1Kh18N9T and aluminum alloys AD-1, AMts in a MST-31 welder. Brittle interlayers were eliminated, destroyed, or removed in the course of friction welding by the low rate of heating which slowed down the diffusive processes, and by forging-pressures. Orig. art. has: 1 table and 4 figures.

ASSOCIATION: VNIIESO ENCL: 01

SUBMITTED: 00 OTHER: 000

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SUB CODE: MM

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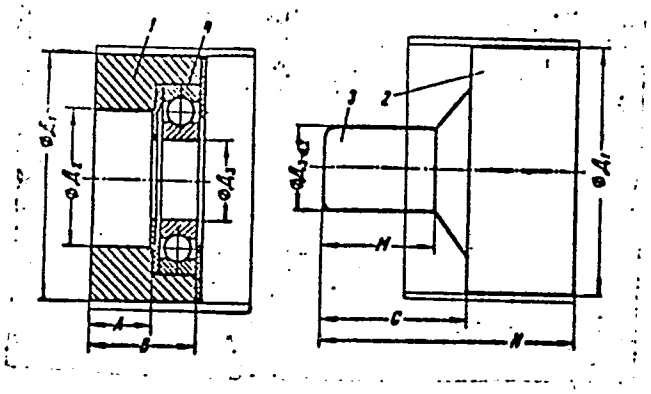


Fig. 1. Device for friction welding of thin-wall pipes.

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S.T.[illegible], L.A., kand.

Friction welding of thin-walled aluminum alloy pipe. Svar. proizv. no.6:23-24 Je '64 (MIRA 18:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut elektrosvarochnogo oborudovaniya.

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Pf-4/Ps-4 IJP(c) MJW/JD/HM

ACCESSION NR: AP5007347 S/0125/65/000/003/0011/0013 60
34
B

AUTHOR: Shternin, L. A. 16

TITLE: Friction welding of unlike metals

SOURCE: Avtomaticheskaya svarka, no. 3, 1965, 11-13

TOPIC TAGS: friction welding, aluminum welding

ABSTRACT: The results are reported of an experimental study of the phenomena transpiring in the butt zone of two pieces of dissimilar metals being friction-welded. AD1, 20-mm diameter aluminum and St3 low-carbon steel specimens were studied at relative rotation speeds of 750, 1000, 1500, 3000, 6000 rpm. Specific pressure was 1—5 kg/mm². It was found that: (1) The sustained temperature of the contact, during the welding process, is independent of the relative-rotation speed and is close to the melt point of the like metals or the lower-melt point in the case of unlike metals (low-carbon steel, 1200C; steel-

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ACCESSION NR: AP5007347

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aluminum, 550C; steel-copper, 950C; steel-titanium, 1200C); (2) The sustained contact temperature decreases with increasing specific pressure during the heating period; (3) The friction welding of AD1 aluminum with various steels offers no difficulty; however, Mg-, Cu-, Zn-, Si-bearing aluminum alloys do not produce satisfactory welded joints with steel. Orig. art. has: 4 figures, 1 formula, and 1 table.

ASSOCIATION: VNIIESO

SUBMITTED: 27Jun64 ENCL: 00 SUB CODE: MM

NO REF SOV: 006 OTHER: 000

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNIN, L.A.

Friction welding of dissimilar metals. Avtom. svar. 18 no.3:11-13 Mr '65. (MIRA 18:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut elektrosvarochnogo oborudovaniya.

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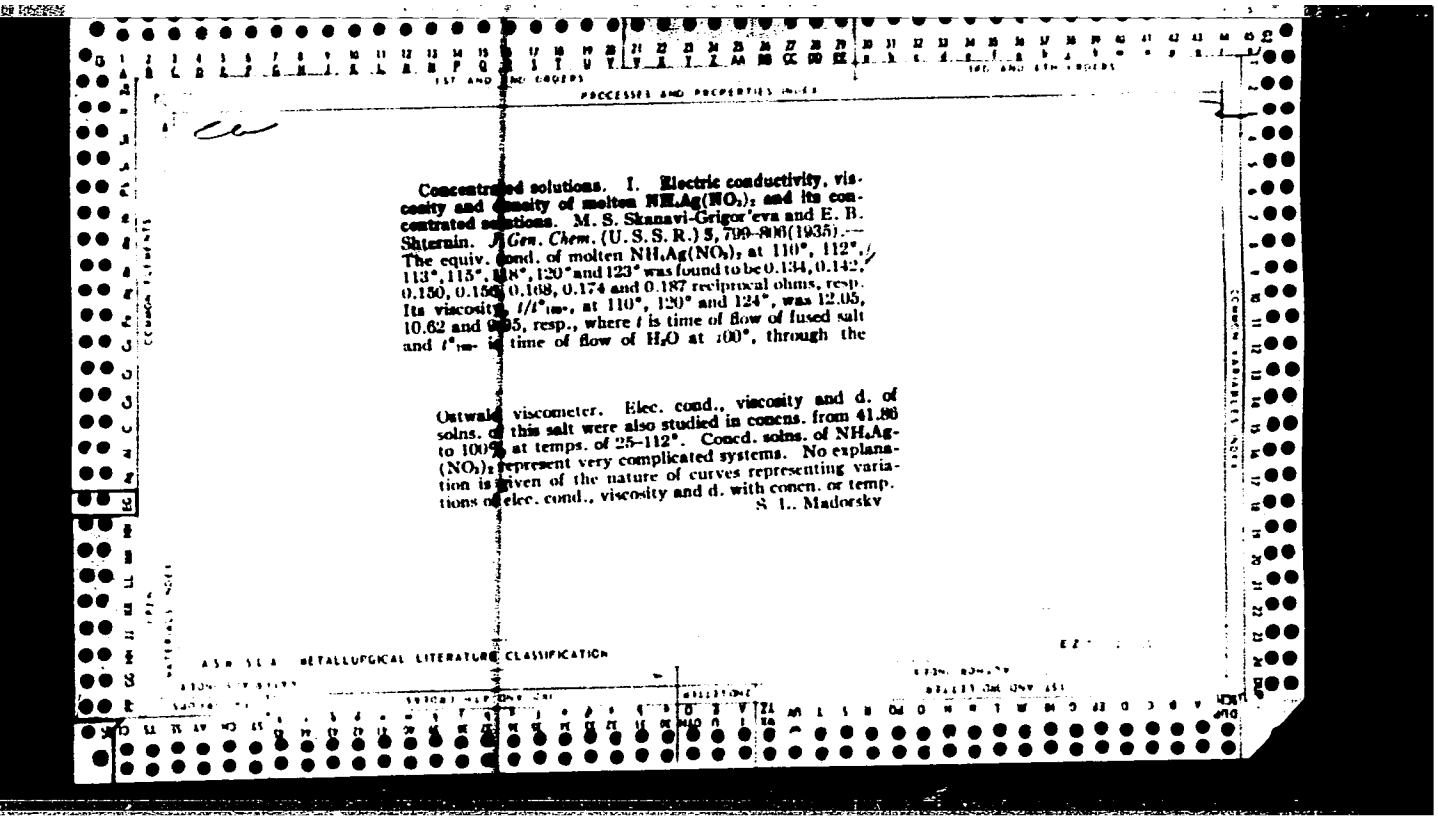

**Concentrated solutions. I. Electric conductivity, viscosity and density of molten $NH_4Ag(NO_3)_2$ and its concentrated solutions.** M. S. Skanavi-Grigor'eva and E. B. Shternin. *J. Gen. Chem.* (U. S. S. R.) 5, 799–806(1935).—The equiv. cond. of molten $NH_4Ag(NO_3)_2$ at 110°, 112°, 113°, 115°, 118°, 120° and 123° was found to be 0.134, 0.142, 0.150, 0.156, 0.168, 0.174 and 0.187 reciprocal ohms, resp. Its viscosity, $t/t°_{H_2O}$, at 110°, 120° and 124°, was 12.05, 10.62 and 9.95, resp., where $t$ is time of flow of fused salt and $t°_{H_2O}$ is time of flow of $H_2O$ at 100°, through the Ostwald viscometer. Elec. cond., viscosity and d. of solns. of this salt were also studied in concns. from 41.86 to 100% at temps. of 25–112°. Concd. solns. of $NH_4Ag(NO_3)_2$ represent very complicated systems. No explanation is given of the nature of curves representing variations of elec. cond., viscosity and d. with concn. or temp.

S. L. Madorsky

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

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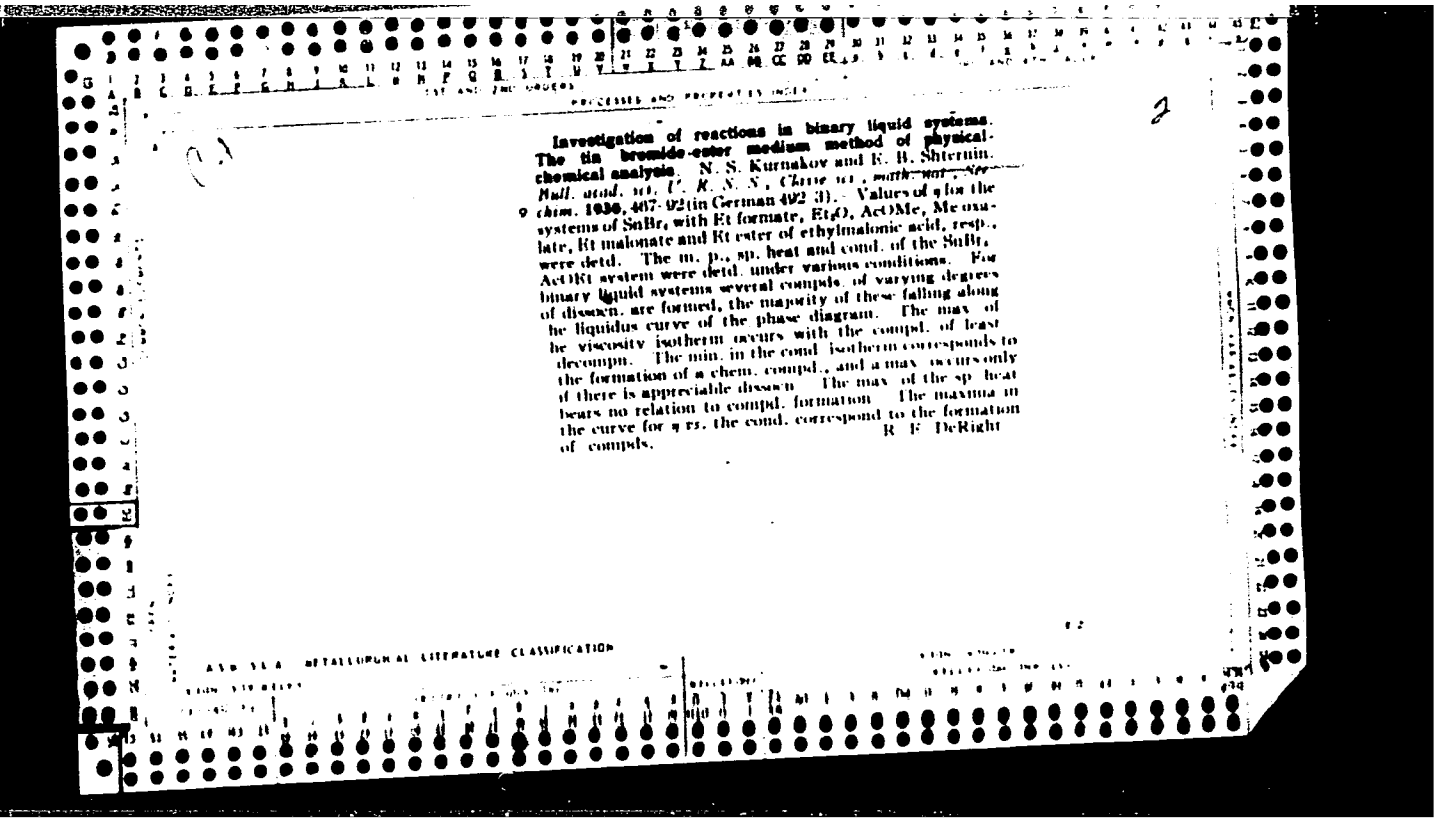

**Investigation of reactions in binary liquid systems. The tin bromide-ester medium method of physical-chemical analysis.** N. S. Kurnakov and E. B. Shternin. *Bull. acad. sci. U. R. S. S., Classe sci. math.-nat., Sér. chim.* **1930**, 407-92 (in German 492-3).—Values of $\eta$ for the systems of $SnBr_4$ with Et formate, $Et_2O$, AcOMe, Me oxalate, Et malonate and Et ester of ethylmalonic acid, resp., were detd. The m. p., sp. heat and cond. of the $SnBr_4$-AcOEt system were detd. under various conditions. For binary liquid systems several compds. of varying degrees of dissocn. are formed, the majority of these falling along the liquidus curve of the phase diagram. The max. of the viscosity isotherm occurs with the compd. of least decompn. The min. in the cond. isotherm corresponds to the formation of a chem. compd., and a max. occurs only if there is appreciable dissocn. The max. of the sp. heat bears no relation to compd. formation. The maxima in the curve for $\eta$ vs. the cond. correspond to the formation of compds.

R. F. DeRight

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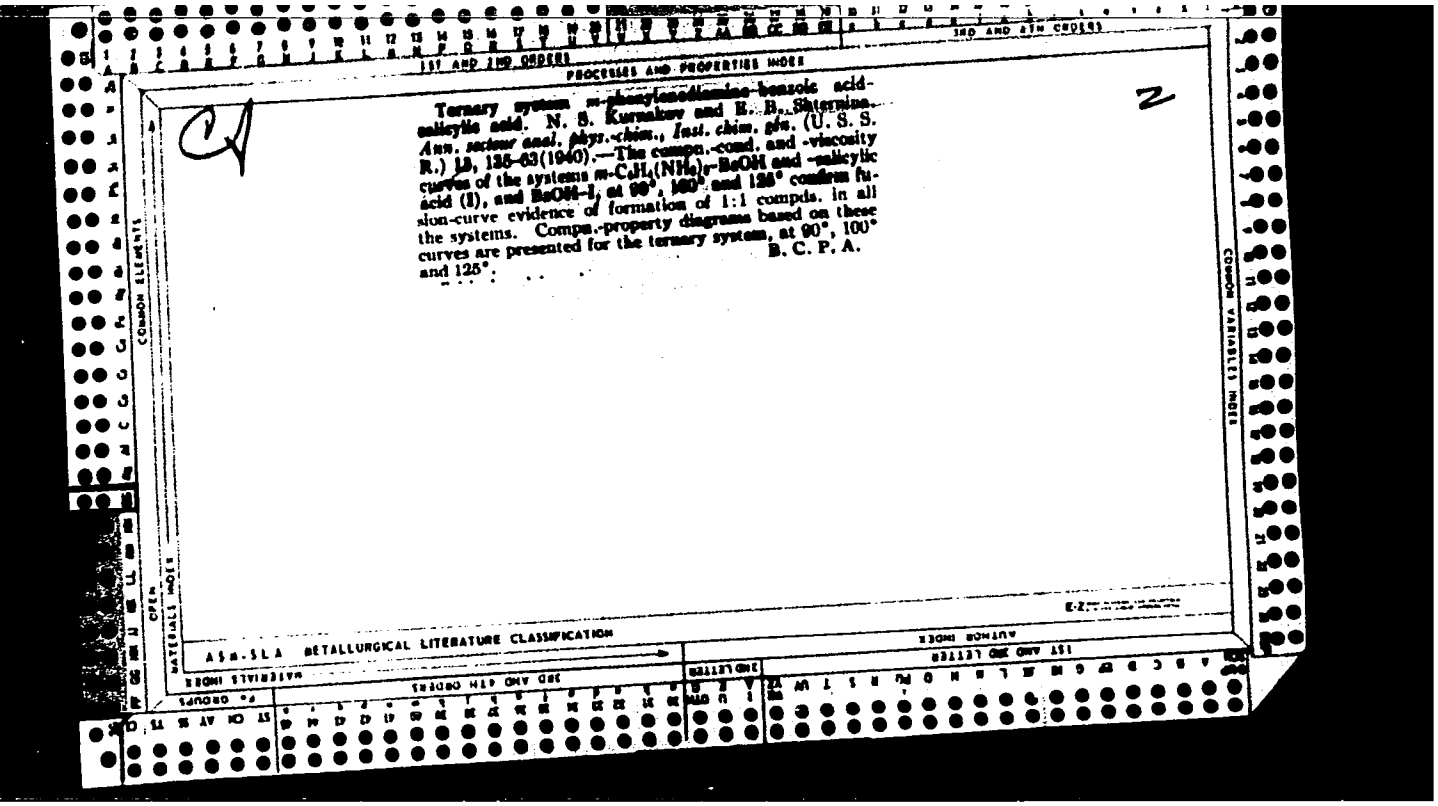

Ternary system *m*-phenylenediamine-benzoic acid-salicylic acid. N. S. Kurnakow and E. B. Shternina. *Ann. secteur anal. phys.-chim., Inst. chim. gén.* (U. S. S. R.) 13, 135–63(1940).—The compn.-cond. and -viscosity curves of the systems *m*-$C_6H_4(NH_2)_2$-BzOH and -salicylic acid (I), and BzOH–I, at 90°, 100° and 125° confirm fusion-curve evidence of formation of 1:1 compds. in all the systems. Compn.-property diagrams based on these curves are presented for the ternary system, at 90°, 100° and 125°.

B. C. P. A.

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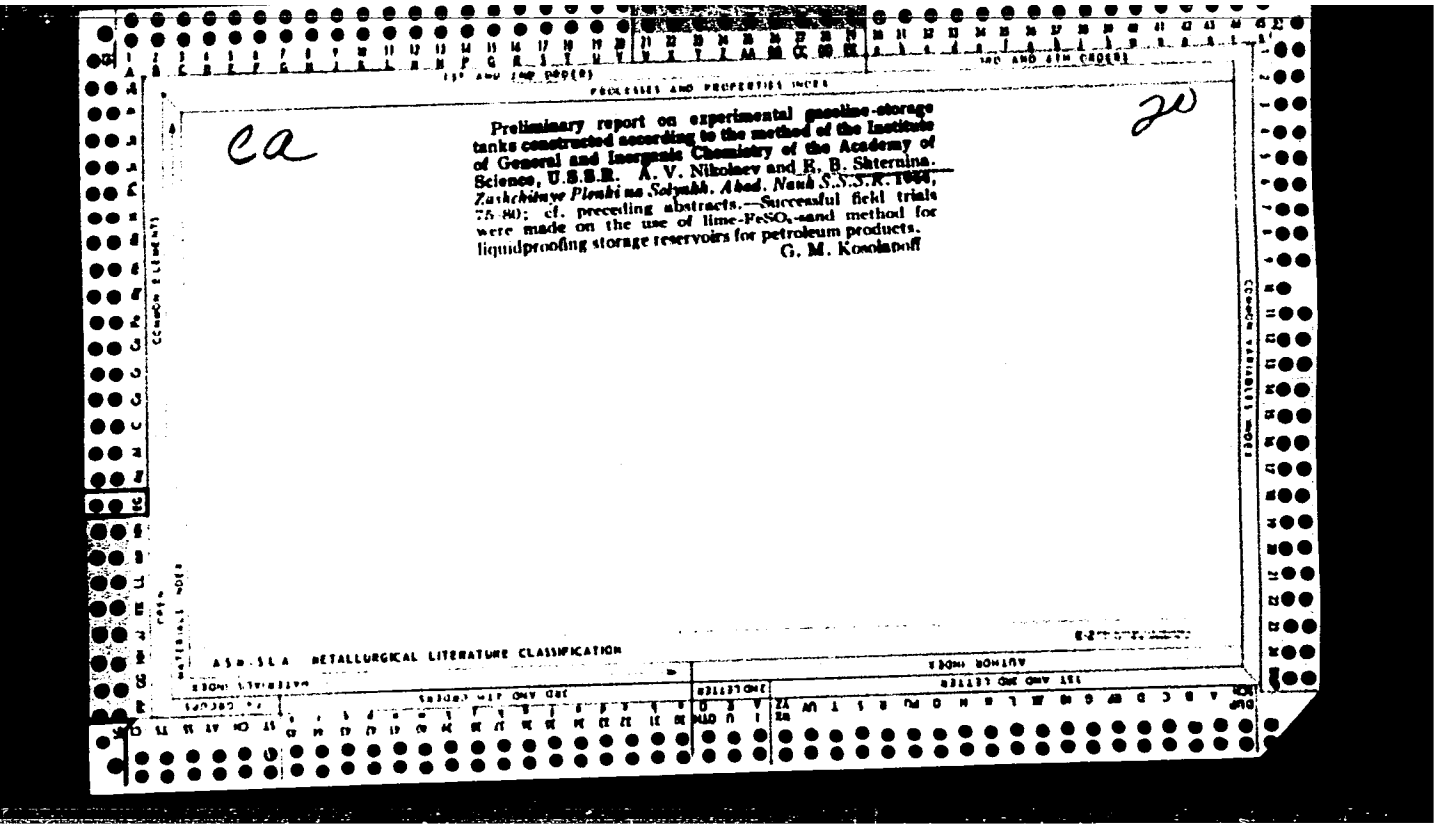
1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS



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20

Preliminary report on experimental gasoline-storage tanks constructed according to the method of the Institute of General and Inorganic Chemistry of the Academy of Science, U.S.S.R. A. V. Nikolaev and E. B. Shternina. *Zashchitnye Plenki na Solyakh. Akad. Nauk S.S.S.R.* 1944, 75-80; cf. preceding abstracts.—Successful field trials were made on the use of lime-$FeSO_4$-sand method for liquidproofing storage reservoirs for petroleum products.

G. M. Kosolapoff

COMMON ELEMENTS

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1ST AND 2ND LETTER

3RD AND 4TH ORDERS

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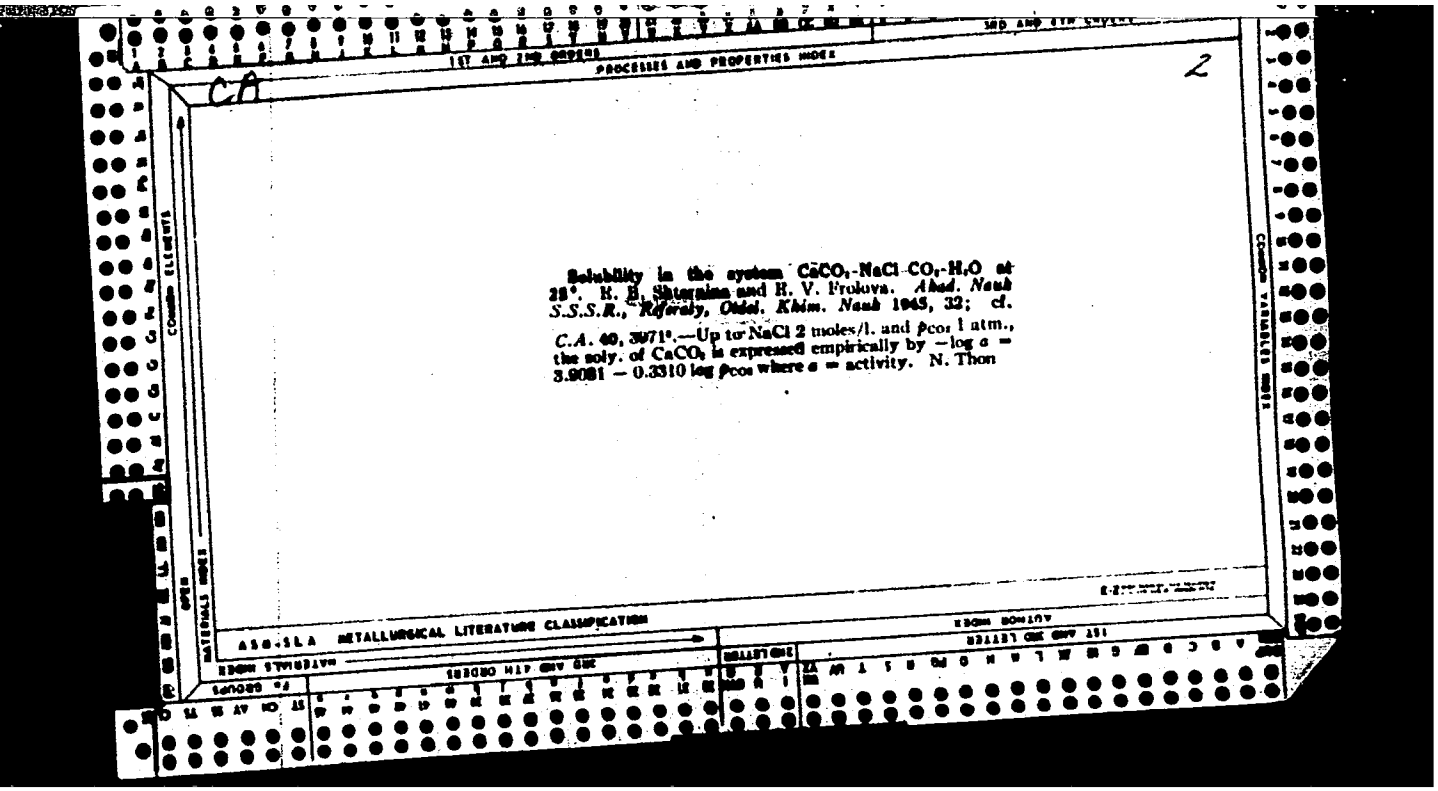

Solubility in the system $CaCO_3$-NaCl-$CO_2$-$H_2O$ at 25°. R. B. Shterzina and R. V. Frolova. *Akad. Nauk S.S.S.R., Riforsky, Otdel. Khim. Nauk* 1945, 32; cf. *C.A.* 40, 3971°.—Up to NaCl 2 moles/l. and $p_{CO_2}$ 1 atm., the soly. of $CaCO_3$ is expressed empirically by $-\log a = 3.9081 - 0.3310 \log p_{CO_2}$ where $a$ = activity. N. Thon

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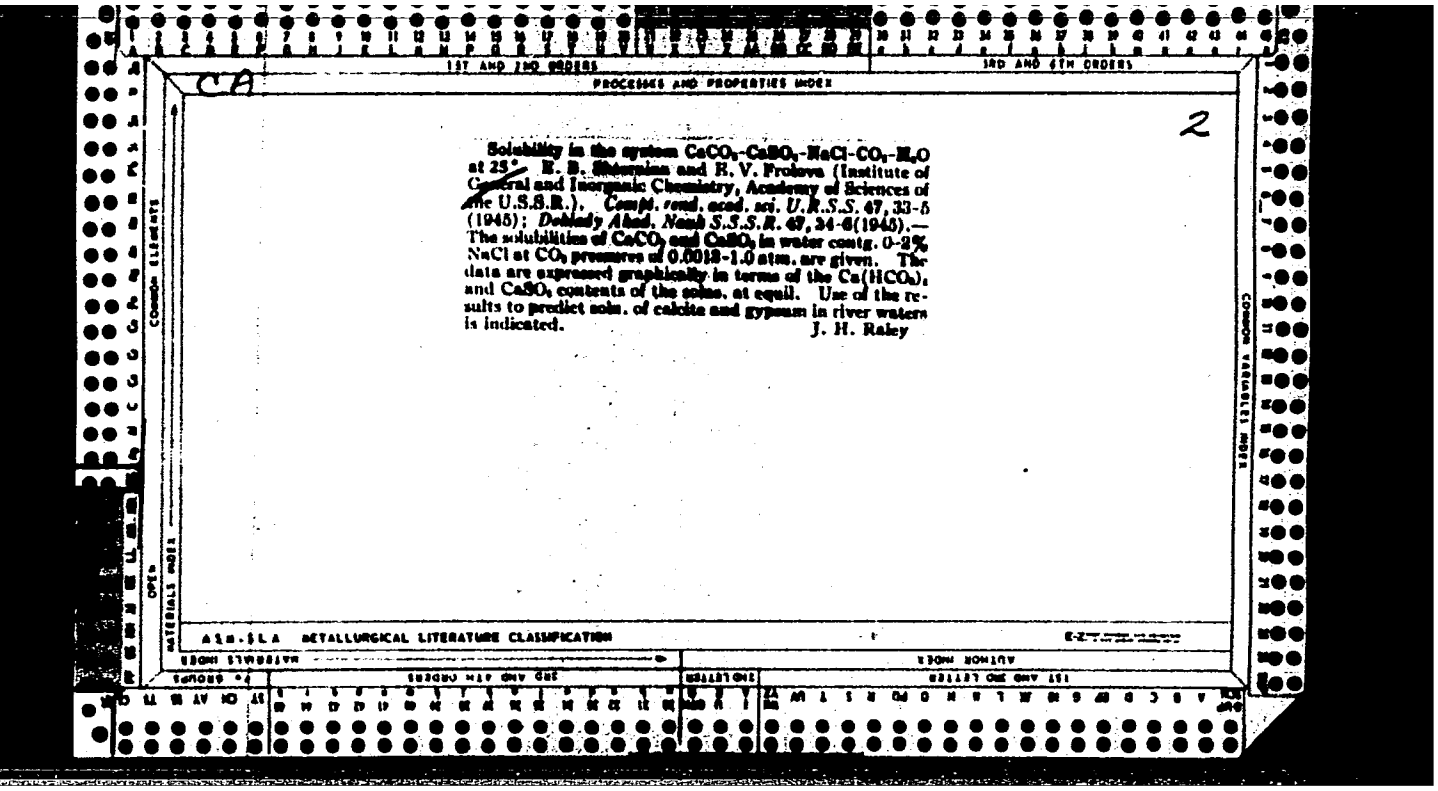

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Solubility in the system $CaCO_3$-$CaSO_4$-NaCl-$CO_2$-$H_2O$ at 25°. E. B. Shteinman and R. V. Frolova (Institute of General and Inorganic Chemistry, Academy of Sciences of the U.S.S.R.). *Compt. rend. acad. sci. U.R.S.S.* 47, 33-5 (1945); *Doklady Akad. Nauk S.S.S.R.* 47, 34-6(1945).—The solubilities of $CaCO_3$ and $CaSO_4$ in water contg. 0-2% NaCl at $CO_2$ pressures of 0.0018-1.0 atm. are given. The data are expressed graphically in terms of the $Ca(HCO_3)_2$ and $CaSO_4$ contents of the solns. at equil. Use of the results to predict solns. of calcite and gypsum in river waters is indicated.

J. H. Raley

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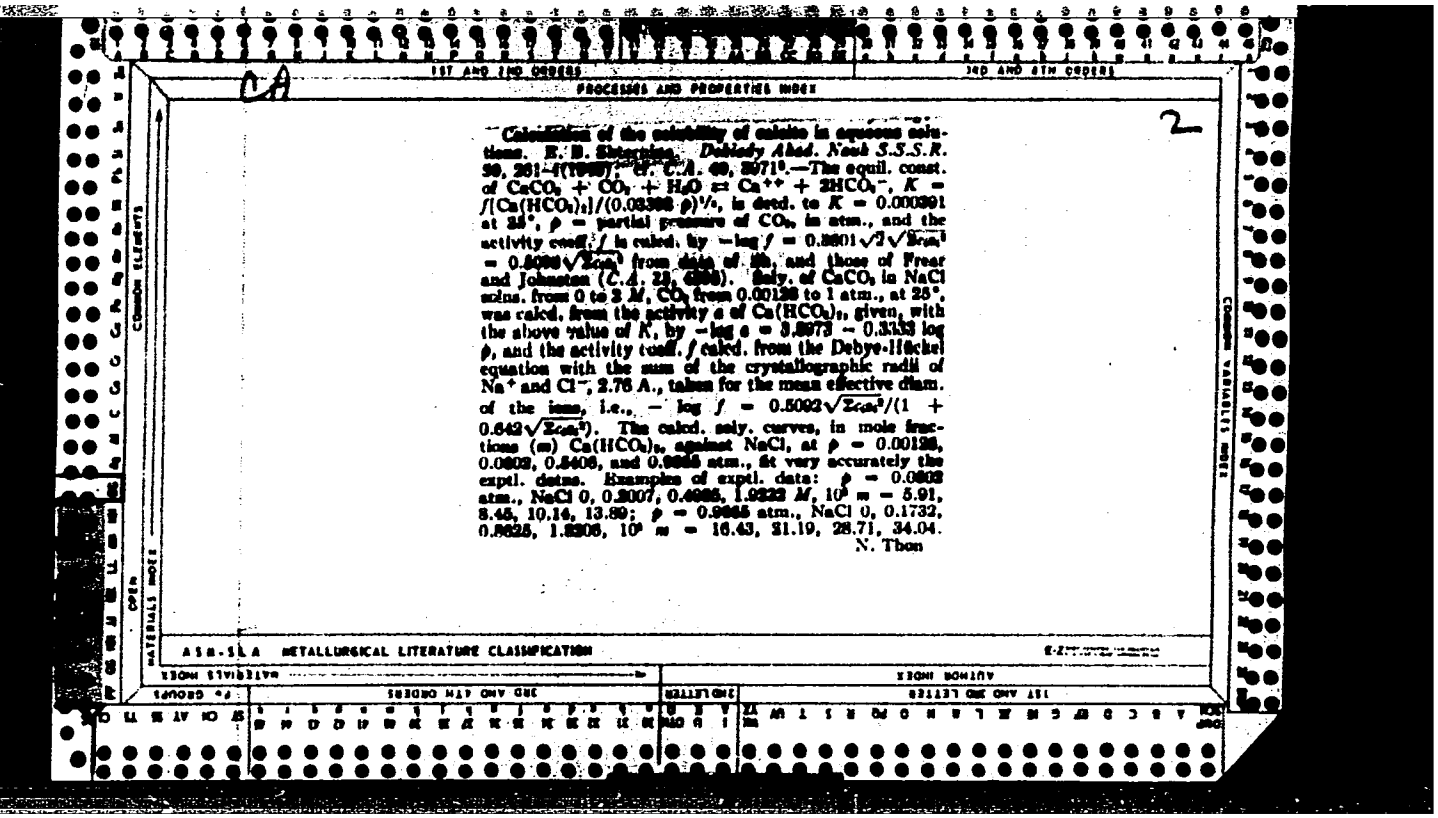

1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

CA

2

**Calculation of the solubility of calcite in aqueous solutions.** E. B. Shternina. *Doklady Akad. Nauk S.S.S.R.* 30, 261-4(1949); cf. *C.A.* 40, 3971[8].—The equil. const. of $CaCO_3 + CO_2 + H_2O \rightleftharpoons Ca^{++} + 2HCO_3^-$, $K = f[Ca(HCO_3)_2]/(0.03398\ p)^{1/2}$, is detd. to $K = 0.000391$ at 25°, $p$ = partial pressure of $CO_2$, in atm., and the activity coeff. $f$ is calcd. by $-\log f = 0.3601\sqrt{2}\sqrt{\Sigma c_i a_i^2} = 0.5098\sqrt{\Sigma c_i a_i^2}$ from data of Sh. and those of Frear and Johnston (*C.A.* 23, 4395). Sely. of $CaCO_3$ in NaCl solns. from 0 to 3 *M*, $CO_2$ from 0.00128 to 1 atm., at 25°, was calcd. from the activity $a$ of $Ca(HCO_3)_2$, given, with the above value of $K$, by $-\log a = 3.8973 - 0.3333 \log p$, and the activity coeff. $f$ calcd. from the Debye-Hückel equation with the sum of the crystallographic radii of $Na^+$ and $Cl^-$, 2.76 A., taken for the mean effective diam. of the ions, i.e., $-\log f = 0.5092\sqrt{\Sigma c_i a_i^2}/(1 + 0.642\sqrt{\Sigma c_i a_i^2})$. The calcd. sely. curves, in mole fractions ($m$) $Ca(HCO_3)_2$, against NaCl, at $p$ = 0.00128, 0.0602, 0.5406, and 0.9665 atm., fit very accurately the exptl. detns. Examples of exptl. data: $p$ = 0.0602 atm., NaCl 0, 0.2007, 0.4985, 1.9222 *M*, $10^3\ m$ = 5.91, 8.45, 10.14, 13.89; $p$ = 0.9665 atm., NaCl 0, 0.1732, 0.8625, 1.8206, $10^3\ m$ = 16.43, 21.19, 28.71, 34.04.

N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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SHTERNINA, Ye. B.

— External components of the fusion diagram of the quaternary reciprocal system $NH_4$, $K\|Cl$, $NO_3$, $H_2PO_4$. A. G. Bergman, V. P. Radishchev, I. N. Nikonova, V. N. Sveshnikova, E. B. Shternina, and M. A. Yatsuk. *Izvest. Sektora Fiz.-Khim. Anal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 15, 157-99(1947).—Studied were the quaternary systems of the 6 salts. In the system $KNO_3$-KCl was observed the compd. $KNO_3.KCl$, m. 360° (decomp.). This compd. had a polymorphic transformation at 255°. At the eutectic point 320° it contd. 6 mol. % of KCl and at the transition point 17.4 mol. % KCl. In the system $NH_4NO_3$-$KNO_3$ was observed the compd. $2NH_4NO_3.KNO_3$, m. 170°. There were indications of the existence of a compd. richer in $KNO_3$. The eutectic of the double salt was at 156.7°, at which point it contd. 11.3 mol. % of $KNO_3$. At the transition point 170.5° it contd. 16.5 mol. % of $KNO_3$. In the eutectic, 147°, system $NH_4NO_3$-$NH_4H_2PO_4$ was observed a wide range of $NH_4H_2PO_4$ solid solns. At the eutectic point this system contd. 12.5 mol. % of $NH_4H_2PO_4$. The eutectic of the system $KNO_3$-$KH_2PO_4$ was at 244.5° and contd. 29.2 mol. % of $KH_2PO_4$. In the system KCl-$KH_2PO_4$, the eutectic point was at 280° when it contd. 5.5 mol. % of KCl. The system $NH_4Cl$-$NH_4H_2PO_4$ had a eutectic point at 184° when it contd. 12.2 mol. % of $NH_4Cl$. $NH_4H_2PO_4$ and $KH_2PO_4$ formed a continuous series of solid solns. The ternary system $NH_4NO_3$-$NH_4H_2PO_4$-$NH_4Cl$ had a eutectic point at 131.5° when it contd. $NH_4NO_3$ 80.25, $NH_4H_2PO_4$ 5.75, and $NH_4Cl$ 14 mol. %. The eutectic point of the system $KNO_3$-$KH_2PO_4$-KCl was at 235° at which point it contd. $KNO_3$ 33.75, $KH_2PO_4$ 58.75, and KCl 7.5 mol. %. Since within this system

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the quaternary reciprocal system $NH_4$, K || Cl, $NO_3$, $H_2PO_4$, *Ibid.* 200–33.—The fusion diagram of the system was studied up to 180° in the region adjacent to $NH_4NO_3$. Within this region were crystd. $NH_4NO_3$, $2NH_4NO_3.KNO_3$, $KNO_3$, $NH_4(K)Cl$, and $NH_4(K)H_2PO_4$. These spaces made contact at the eutectic point approx. 123° and at the transition point approx. 134°. At the eutectic point the approx. compn. was $NH_4$ 90.5, K 9.5, Cl 13.75, $H_2PO_4$ 3.75, $NO_3$ 82.50 ion %, and the solid phases $NH_4(K)Cl$ + $NH_4(K)H_2PO_4$ + $NH_4NO_3$ + $2NH_4NO_3.KNO_3$. At the transition point the approx. compn. was $NH_4$ 86.0, K 14.0, Cl 13.25, $H_2PO_4$ 4.80, $NO_3$ 81.95 ion %, and the solid phases $2NH_4NO_3.KNO_3$ + $NH_4(K)Cl$ + $NH_4(K)H_2PO_4$ + $KNO_3$. Also studied was the effect of addn. of NaCl and $KH_2PO_4$ on the m.p. Addn. of NaCl lowered the quaternary eutectic point, 123°, by 9°. Addn. of $KH_2PO_4$ lowered the eutectic point, 112°, of the ternary system $NH_4$, Na || Cl, $NO_3$ by 9°.

M. Hoseh

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SHTERNINA, Ye. B. 62T3

USSR/Chemistry - Gypsum - Solubility Apr 1948
Chemistry - Potassium Sulfate

"Trial Computation of the Solubility of Potassium Sulfate in a Water Solution of Sodium Chloride," E. B. Shternina, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LX, No 2

Data on the solubility of gypsum in water solutions of salt, and carbon dioxide at 25° temperature, from which it was simple to determine the coefficient of activity of potassium sulfate. Debye's and Huechel's formulas were used to determine this activity. Submitted by Academician G. G. Urazov, 13 Feb 1948

62T3

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CA

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**Solubility of gypsum in salt solutions.** E. B. Shternina. *Izvest. Sektora Fiz.-Khim. Anal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 17, 351-69(1949); cf. *C.A.* 40, 3971[6]; 43, 6880r.—The system investigated was $CaSO_4$-NaCl-$CO_2$-$H_2O$ at 25°. The concn. of NaCl varied from 0 to satn. The partial pressure of $CO_2$ did not exceed 1 atm. Every 2-3 days the liquid phase was analyzed for $Ca^{++}$, $SO_4^{--}$, and $Cl^-$. This was continued until 2 consecutive analyses differed by no more than 0.01 g. of $CaSO_4$ per 1 l. of soln. $CO_2$ had no effect on the soly. of $CaSO_4$. The soly. of $CaSO_4$ was calcd. by means of the Debye-Hückel equation (*C.A.* 17, 2665; 18, 3514) in which the values of consts. were taken from Birge (*C.A.* 36, 1221[7]) and Wensel (*C.A.* 33, 4835[9]). As the concn. of NaCl increased from 0 to 317.228 g./l. (0-5.427 mols./l.), the soly. of $CaSO_4$ rose from 2.083 (0.01530 mol./l.) to a max. of 7.236 g./l. (0.05315 mol./l.) and then dropped to 5.816 g./l. (0.04272 mol./l.). The max. occurred at a NaCl concn. of 138.756 g./l. The exptl. curves giving the relation between the mean effective diam. of ions ($b$) and concn. can generally be expressed by

$b = b_0 + (b_{as}/\sum_{satd.} c_i z_i^2)\sum c_i z_i^2$, where $b_0$ is the av. crystallographic diam. of $Ca^{++}$ and $SO_4^{--}$ (= 3.11 A.), $b_{as}$ is the av. crystallographic diam. of the ions of the added salt, $\sum_{satd.} c_i z_i^2$ is the ionic strength of a satd. soln. of the added salt, and $\sum c_i z_i^2$ is the ionic strength of the given soln. of the added salt.

M. Hoseh

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SHTERNINA, M.B.

D.I. Mendeleev theory on solutions. Izv. Sekt. fiz. khim. anal. 18:231-246 '49. (MIRA 11:4)

1. Institut obshchey i neorganicheskoy khimii im. N.S. Kurnakova AN SSSR.

(Mendeleev Dmitrii Ivanovich, 1834-1907)
(Solution (Chemistry))

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SHTERNINA, E. B.

Solubility of calcite in the presence of carbon dioxide and sodium chloride. E. B. Shternina and B. V. Frolova (N. S. Kurnakov Inst. Gen. Inorg. Chem., Acad. Sci., U.S.S.R., Moscow). *Izvest. Sektora Fiz.-Khim. Anal. Inst. Obshchei Neorg. Khim., Akad. Nauk S.S.S.R.* 21, 271–87(1952).—Iceland spar crushed to +0.5 mm. was used, and the expts. were made at 25 ± 0.05°. In the system $CaCO_3$–NaCl–$CO_2$–$H_2O$ equil. was attained only after 1–2 months. To get the soly. of a sparingly sol. salt are required the activity ($a$) and the coeff. of activity ($\gamma$) of this salt. $a$ was detd. in dil. solns. and was calcd. from the Debye-Hückel equation assuming that the size of ions increases directly with the concn. of the sol. salt. This relation can be expressed by $b = b_s + (b_w / \Sigma m_i Z_i^2)\Sigma m_{i,s} Z_i^2$, where $b$ is the av. size of ions in the system, $b_s$ and $b_w$ are the av. crystallographic sizes of ions of the sparsely ($s$) and well ($w$) sol. salts, $\Sigma m_{i,s}$ is the ionic strength of the added well-sol. salt in satd. soln., and $\Sigma m_i Z_i^2$ is the ionic strength of the given soln. of the added well-sol. salt. The soly. of calcite and gypsum in the presence of NaCl had a max. but the corresponding $\gamma$ had a min. If it were assumed that the av. distance between ionic centers is independent of concn., then the soly. of gypsum would be constantly increasing and $\gamma$ constantly decreasing with increasing concn. of NaCl. In the case of gypsum the max. on the soly. curve corresponds to the min. on the $\gamma$ curve which in turn is detd. by the increase in the av. distance between ions with increasing concn. of NaCl. In the case of calcite, the situation is more complicated, since the $a$ of $Ca(HCO_3)_2$ does not remain const. but changes with $CO_2$ content according to $a = 0.0213\ [CO_2]^{1/3}$. Also NaCl has a salting-out effect on $CO_2$. Thus, NaCl on the one hand increases the soly. of $CaCO_3$ even as of $CaSO_4$ and on the other hand it lowers the soly. of $CaCO_3$ by decreasing the soly. of $CO_2$. M. Hoch

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SHTERNINA, E. B.

E. T. R.
June 1954
Chemistry-Physical

6

**7715 Calculation of Solubility of Calcite in Aqueous Solutions.** E. B. Shternina. *Henry Brutcher, Altadena, Calif., Translation no. 3182, 8 p.* (From *Doklady Akademii Nauk SSSR*, v. 50, 1954, p. 261-264.)

Application of quantitative thermodynamics and modern solution theory to construction of solubility diagrams. Tables, graph. 9 ref.

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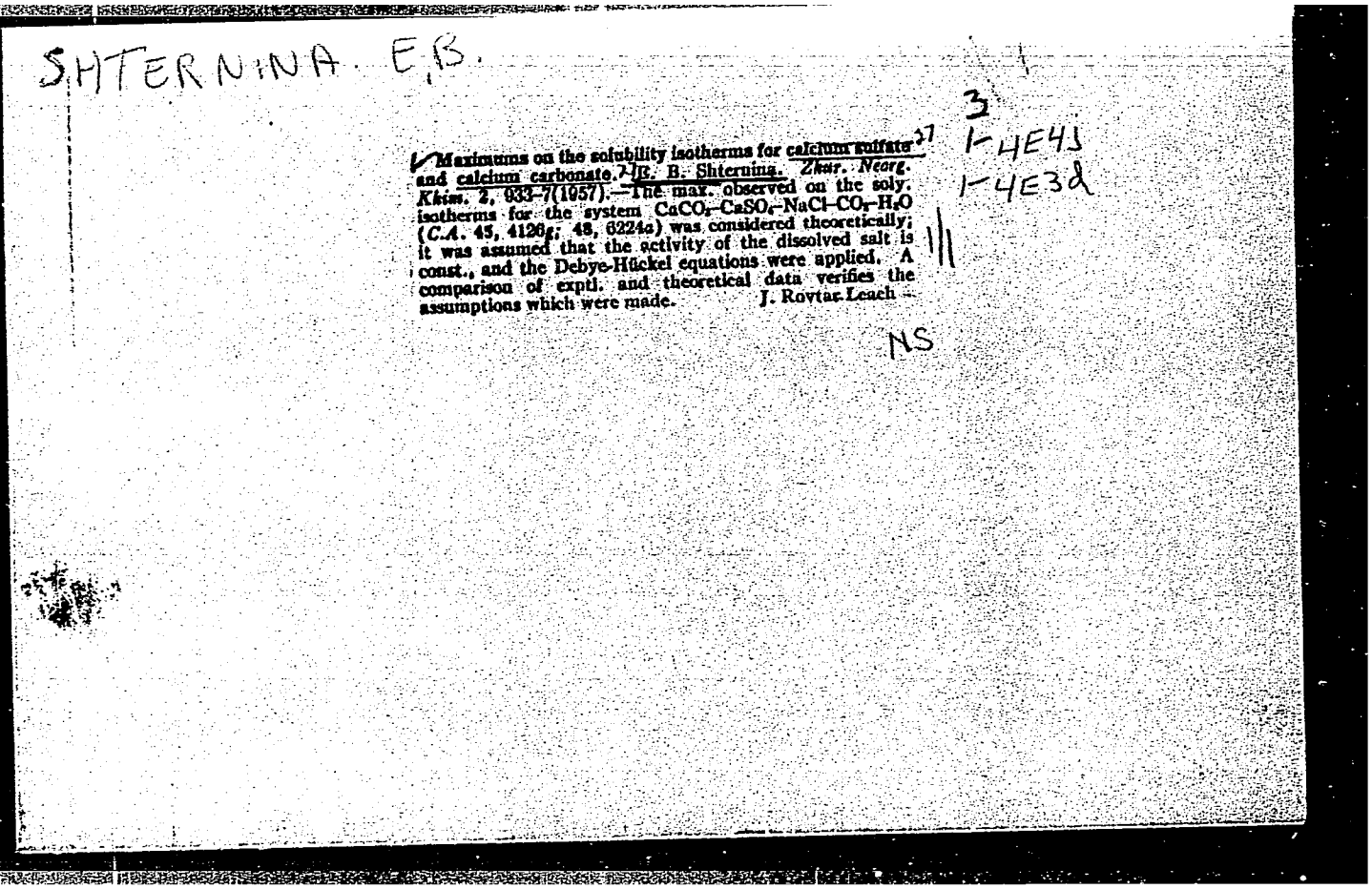

SHTERNINA, E.B.

3
I-4E41
I-4E32

Maximums on the solubility isotherms for calcium sulfate and calcium carbonate. E. B. Shternina. *Zhur. Neorg. Khim.* 2, 933–7(1957).—The max. observed on the soly. isotherms for the system $CaCO_3$–$CaSO_4$–NaCl–$CO_2$–$H_2O$ (*C.A.* 45, 4126g; 48, 6224a) was considered theoretically; it was assumed that the activity of the dissolved salt is const., and the Debye-Hückel equations were applied. A comparison of exptl. and theoretical data verifies the assumptions which were made. J. Rovtar-Leach

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SHTERNINA, E.B.

Solubility of poorly soluble salts in aqueous solutions of electrolytes. Itogi nauki: Khim.nauki 4:55-60 '59.
(MIRA 13:4)

(Electrolytes) (Solubility) (Salts)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNINA, E.B.

Solubility in complex salt systems. Biul. MOIP. Otd. geol. 34 no.5:158-159 S-O '59. (MIRA 14:6)
(Solubility)

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SOV/62-60-1-1/37

AUTHOR: Shternina, E. B.

TITLE: Concerning Solubility of Salts in Aqueous Solutions of Electrolytes

PERIODICAL: Izvestiya Akademii nauk. Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 3-8 (USSR)

ABSTRACT: Determination of solubility of salts in complex systems, like concentrated aqueous solutions containing ions of the same salt or ions of other salts, was studied. Different methods and formulae for calculating solubilities are reviewed The author states that the various known formulae are not applicable to the concentrated and complex systems. A new method of determination of solubility is proposed. Solubility (x) is considered as a product of solubility coefficient ( $\beta$ ) and activity ( $a$ )

Card 1/3

$$x = \beta a \qquad (5)$$

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$\alpha$ is a constant. It was assumed that the solubility coefficient rises with electrostatic interaction of ions and falls with decreasing volume concentration of water

$$\beta = \frac{z_1 z_2 \ldots \sqrt{\Sigma m_i z_i^2}}{\frac{D_1 - D}{C}} \qquad (6)$$

where $z_1 z_2$ are the valences of the solid ions; $\sqrt{\Sigma m_1 z^2_1}$ is the ionic strength of solution; $D_1$ is the number of moles of water in 1 liter of pure water, $D_1 = 55.3434$ at $25^\circ$; D is moles of water in 1 liter of solution.

$$D = \frac{55.506\,d}{1000 + g}, \qquad (7)$$

where 55.506 is the number of moles of water in 1,000 g of water; d is density of the solution; g is total



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weight (grams) of all dissolved compounds per 1,000 g of water; C is the sum of moles of all dissolved compounds in 1 liter of solution, $C = \sum c_i$, where $c_i$ is moles of compound i per liter of solution.

$$c_i = \frac{1000\, m_i d}{1000 + g}, \qquad (8)$$

where $m_i$ is moles of compound i per 1,000 g of water. Solubilities calculated according to the above method are confirmed by experimental data. There are 20 references, 2 U.S., 1 U.K., 2 Indian, 4 German, and 11 Soviet. The U.S. and U.K. references are: R. A. Robinson, R. H. Stokes, Electrolyte Solutions, London, 1955; T. H. Gronwall, V. K. La Mer, L. J. Greiff, J. Phys. Chem 35, 2245 (1931); E. Wicke, M. Eigen, J. Phys. Chem., 58, 702 (1954).

ASSOCIATION: N. S. Kurnakov Institute of General and Inorganic Chemistry, Academy of Sciences USSR (Institut obshchey i neorganicheskoy khimii imeni N. S. Kurnakova Akademii nauk SSSR)

SUBMITTED: May 28, 1959



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SHTERNINA, E.B.; FROLOVA, Ye.V.

Removal of ballast carbonates from Kara-Tau phosphorite ores.
Zhur.prikl.khim. 35 no.4:751-756 Ap '62. (MIRA 15:4)

1. Institut obshchey i neorganicheskoy khimii imeni N.S.Kurnakova AN SSSR.
(Kara-Tau--Phosphorites) (Carbonates)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNINA, E.B.; RYKOVA, G.A.

Minimum on solubility isotherms. Zhur. neorg. khim. 10 no.9:2152-2155 S '65. (MIRA 18:10)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SALGANIK, R.I., kand.biolog.nauk; SHTERNISHIS, Yu.S. (Novosibirsk)

Use of deoxyriboneclease in suppurative processes in the lungs. Klin.med. 40 no.6:95-100 Je '62. (MIRA 15:9)

1. Iz laboratorii nukleinovykh kislot i nukleoproteidov (zav. - kand.biol.nauk R.I. Salganik) Instituta tsitologii i genetiki Sibirskogo otdeleniya AN SSSR.
(LUNGS--DISEASES) (DEOXYRIBONUCLEASE)

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L 62811-65

ACCESSION NR: AP5016387 UR/0120/65/000/003/0129/0131
621.375.2.4

AUTHOR: Shternov, A. A. 16 B

TITLE: Tunnel diode pulse amplifier

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1965, 129-131

TOPIC TAGS: tunnel diode amplifier, semiconductor pulse amplifier, pulse amplifier

ABSTRACT: A TD pulse amplifier with a 340-Mc amplification area has been studied theoretically and experimentally. Maximum amplification was obtained by connecting the diode in parallel to the load as shown in Fig. 1 of the Enclosure. The gain is 1.35 and the rise time depends essentially on gain. For practical applications the applied signal should be blocked from the d-c bias source. Orig. art. has: 9 formulas and 2 figures. [08]

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri GGU (Scientific Research Institute of Radio Physics at GGU)

SUBMITTED: 17May64 ENCL: 01 SUB CODE: EC

NO REF SOV: 001 OTHER: 001 ATD PRESS: 4056

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L 62811-65

ACCESSION NR: AP5016387

ENCLOSURE: 01

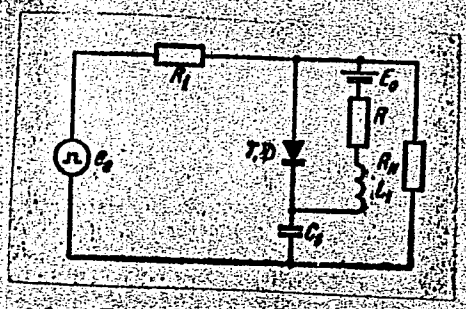


Fig. 1. Tunnel diode pulse amplifier

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

ACCESSION NR: AP4029460 S/0108/64/019/004/0046/0051

AUTHOR: Lezin, Yu. S. (Active member); Shternov, A. A. (Active member)

TITLE: Noncoherent exponential-weight storage of packets of pulse signals with nonsquare envelopes

SOURCE: Radiotekhnika, v. 19, no. 4, 1964, 46-51

TOPIC TAGS: pulse signal, pulse packet, nonsquare envelope, pulse packet storage, radar detection

ABSTRACT: An approximate calculation is made of the threshold signal-to-noise ratio for two nonsquare cases of pulse-packet envelopes. For triangular and sinusoidal envelopes, formulas are developed for the probability of correct radar detection; also, the threshold signal-to-noise ratio vs. pulse number per packet curves are presented; a square-law exponential-weight packet storage is assumed. It is proven that, with a constant maximum signal amplitude and pulse

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ACCESSION NR: AP4029460

number per packet, a change in the envelope shape — from triangular to sinusoidal or from sinusoidal to square — results in a reduction of the threshold signals. This may be explained by an increase in the energy of the packet. Orig. art. has: 3 figures and 16 formulas.

ASSOCIATION: Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi (Scientific and Technical Society of Radio Engineering and Electrocommunication)

SUBMITTED: 12Feb63 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: EC, DC NO REF SOV: 005 OTHER: 000

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

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AYZENBERG, D.Ye.; BELEVTSEV, Ya.N.; BORDUNOV, I.N.; BORISENKO, S.T.; BULKIN, G.A.; GORLITSKIY, B.A.; DOVGAN', M.N.; ZAGORUYKO, L.G.; KAZAKOV, L.R.; KALYAYEV, G.I.; KARASIK, M.A.; KACHAN, V.G.; KISELEV, A.S.; LAGUTIN, P.K.; LAZARENKO, Ye.K.; LAZARENKO, E.A.; LAPITSKIY, E.M.; LAPCHIK, F.Ye.; LAS'KOV, V.A.; LEVENSHTEYN, M.L.; MALAKHOVSKIY, V.F.; MITKEYEV, M.V.; PRUSS, A.K.; SKARZHINSKIY, V.I.; SKURIDIN, S.A.; SOLOV'YEV, F.I.; STRYGIN, A.I.; SUSHCHUK, Ye.G.; TEPLITSKAYA, N.V.; FEDYUSHIN, S.Ye.; FOMENKO, V.Yu.; SHKOLA, T.N.; SHTERNOV, A.G.; YAROSHCHUK, M.A.; ZAVIRYUKHINA, V.N., red.

[Problems of metallogeny in the Ukraine] Problemy metallogenii Ukrainy. Kiev, Naukova dumka, 1964. 254 p. (MIRA 18:1)

1. Akademiya nauk URSR, Kiev. Instytut geologichnykh nauk.

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SHTERNOV, M. M.

SHTERNOV, M. M. -- "Systems of Metal-Drawing Grooves." Min Higher Education USSR. Ural Polytechnic Inst imeni S. M. Kirov. Sverdlovsk, 1955. (Dissertation for the Degree of Candidate of Technical Sciences.)

SO: Knizhnaya Letopis', No 5, Moscow, Feb 1956

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

KOZHEVNIKOV, V.P., inzhener; BAKHTINOV, B.P., inzhener; MEREKIN, S.V., inzhener; SHTERNOV, M.M., inzhener; GRITSUK, N.F., inzhener.

Turn-over rollers for continuous billet mills. Stal' 15 no.1:54-58 Ja '55. (MLRA 8:5)

1. Magnitogorskiy metallurgicheskiy kombinat.
(Rolling-mill machinery)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SHTERNOV, M.M., kandidat tekhnicheskikh nauk.

Rolling special channel iron with wide flanges. Stal' 17 no.1:90-91 Ja '57. (MLRA 10:3)

1. Magnitogorskiy metallurgicheskiy kombinat.
(Rolling (Metalwork))

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

BAKHTINOV, B.P.; FURMAN, Ya.B; SHTERNOV, M.M.

"Wear of iron mill rolls" by A.P. Chekmarev, R.A. Moshkovtsev. Reviewed by B.P. Bakhtinov, IA.B.Furman, M.M. Shternov. Stal' 17 no.1:95-96 Ja '57. (MLRA 10:3)

1. Magnitogorskiy metallurgicheskiy kombinat.
(Rolls (Iron mills))

(Chekmarev, A.P.) (Moshkovtsev, R.A.)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

130-1-12/17

AUTHORS: Shternov, M.M., Candidate of Technical Sciences, and Gritsuk, N.F., Engineer.

TITLE: New Designs of Roller Rolling Equipment (Novyye konstruktsii rolikovoy valkovoy armatury)

PERIODICAL: Metallurg, 1958, No.1, pp. 23 - 28 (USSR)

ABSTRACT: Some designs of guide blocks developed in connection with the increasing speed of rolling are described. The equipment described was designed by the roll-pass department of the Magnitogorsk Metallurgical Combine in collaboration with mill operators for the automatic 300 mill. The mill is intended to roll small channels, angles, rounds, squares and strip. It is of the cross-country type with ten working stands, the rolling speed in the finishing stands being 9-11 m/second with a billet weight of 200-500 kg. The article gives details of the front and back guide blocks for some of the products and discusses the advantages of these roller types over the friction types. The dimension of the guide blocks in relation to each other and the stand dimensions have been selected to minimise the amount of equipment required for the range of products rolled. The designs provide for the rapid changing of blocks and for mechanized movement along the barrel of the roll, and are based on the principle of the separation of parts needing adjustment during work from the fixing elements. It is

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New Designs of Roller Rolling Equipment

suggested that the rollers should be made of ordinary engineering steels and hard-faced with wear-resistant alloys and that high-grade textolite is a suitable bearing material for the finishing and pre-finishing stands with rolling speeds over 6-6.5 m/sec. The possibility of using high-chromium iron inserts instead of the rollers at the inlet to the roughing stands is briefly mentioned. In the design of the equipment, Soviet and foreign practical experience is said to have been utilized. There are 4 figures.

ASSOCIATION: Magnitogorsk Metallurgical Combine (Magnitogorskiy metallurgicheskiy kombinat)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020007-1

SOV/133-59-5-14/31

AUTHOR: Shternov, M.M., Candidate of Technical Sciences

TITLE: A Modern Continuous Billet Mill (Sovremennyy nepreryvno-zagotovochnyy stan)

PERIODICAL: Stal', 1959, Nr 5, pp 429 - 432 (USSR)

ABSTRACT: The relative merits of continuous billet mills with only horizontal stands and with alternating horizontal and vertical stands are discussed. The author is in favour of mills of the first type, stressing their lower capital and maintenance costs, the possibility of using longer rolls with many rolling lines, ease of transfer from one profile to another, the possibility of transferring in one rolling line from rectangular-square passes to rhombic-square passes, etc. It is pointed out in the editorial notes that some of the author's concepts are based on experience of operation of mills with horizontal stands only and can be contested. As the problem is of great importance,

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discussion on the subject is invited.
There are 3 figures.

ASSOCIATION: Magnitogorskiy metallurgicheskiy kombinat
(Magnitogorsk Metallurgical Combine)



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